BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
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	)	
Authorization and Use of Software Defined Radios	)	ET Docket No. 00-47
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COMMENTS OF AIRNET COMMUNICATIONS

As one of the commentors to the original FCC NOI on SDR, AirNet Communications Corp. (AirNet) is pleased with the Commission's proposed new rules to support the development of SDR technology. The Commission's action will encourage the advancement of the promising SDR by striking a delicate balance between the need for regulation versus potential over-regulation. AirNet believes that the new rules proposed by the Commission in this *Notice* will provide the regulatory flexibility that will be critical to the deployment of SDR technology to benefit the American public.

This proceeding discussed four main topics: the current state and future prospects of SDR technology; the likelihood of SDR smoothing interoperability between radio services; the prospects for SDR-driven improvements in spectrum efficiency; and whether the Commission should consider SDR-related changes to its equipment-approval processes.

AirNet believes that the Commission has an in-depth understanding with respect to each of these issues as reflected in its proposed new rules. The Commission's understanding of the state of SDR technology is an appropriate balance between the

promise of SDR today, and the recognition that additional advances will be made to fully realize its potentials. SDR has the potential to be an efficient, inexpensive method by which multi-mode, multi-band radios can be produced. AirNet has commercially deployed this technology in the US for over four years and we believe that the widespread use of SDR can be expected within the next few years.

The Commission also rightly notes that SDR may improve interoperability between public-safety agencies and between commercial services. The ability to implement multiple air interfaces and ability to add new interfaces as they are developed is achievable with SDR by adding or updating software. Likewise, SDR promises significant improvement in the efficiency of spectrum use. AirNet supports both the Commission's vision for the future and its resistance to the rule changes in these areas until it becomes necessary. We look forward to assisting the Commission's on-going efforts to monitor these capabilities and consider additional rule revisions at the appropriate time.

With respect to equipment approval, the Commission sought comments on its tentative conclusion that radio hardware and software should be approved in combination. As SDR technology advances and the Commission gains confidence in manufacturers' abilities to design compliant equipment, it would make sense to test hardware and software separately. However, AirNet agrees that certifying hardware/software combinations is no more burdensome than the existing process and to ensure that SDR equipment complies with the Commission's technical requirements.

I. The Commission Should Clarify the Definition of Software Defined Radio

The Commission has proposed the following definition to describe those devices that are eligible for regulatory treatment as software defined radios:

> A software defined radio is a radio that includes a transmitter in which the operating parameters of the transmitter, including the frequency range, modulation type, or maximum radiated or conducted output power can be altered by making a change in software without making any hardware changes.

We support the Commission's effort to craft a definition that is simple, accurate, and flexible. However, AirNet believes that the simplicity of this definition could be too broad and open to interpretation, specifically to the definition of "a change in software."

For example, does the definition imply that a software change can be extended to programmable logic that may be downloaded to hardware devices by a software application? Or software changes that may make use of hardware that may have been included in the original hardware platform design but was not utilized in a previous certification and approval process? AirNet suggests that the software changes should also include software downloadable or configurable changes to programmable hardware devices.

We therefore ask the Commission to clarify the SDR definition to provide clearer and more concise interpretation of what constitutes a software change and hardware change.

II. The Commission Should Modify the "Class III" Proposal

AirNet applauds the Commission's proposal to create a new "Class III" procedure to streamline the approval process for software defined radios. Allowing Class III changes to be made within an existing authorization is a major improvement over the

current rules, which require an entirely new certification. Although AirNet supports allowing manufacturers to self-approve SDR equipment in its previous comments, the Class III proposal is an acceptable compromise between the benefits of regulatory relief and the Commission's desire to gain confidence in the compliance abilities of SDR-enabled equipment. However, AirNet is still not clear how the definition of Class III permissive change would streamline the process as testing and demonstrating compliance appear to be the same as the original certification. AirNet seeks further clarification of this issue under the proposed rule.

AirNet supports the Commission's proposed rules requiring the original certification identifying the equipment as a SDR, and only the grantee of the original authorization is allowed to file for a Class III permissive change to eliminate any confusion over the ownership of the authorization. AirNet also supports the Commission on its proposal to require that Class III permissive changes may only be requested where there are no hardware changes other than software re-programmed changes to previously approved hardware. In addition, AirNet suggests that the filing fee for a Class III should be reflective of the streamlined process as opposed to the original certification. This new fee should encourage the development and designation of new radio equipment as a SDR to take advantage of this new streamlined process.

The Commission also requests comments on whether a Class III permissive change should be limited only to software change, whether a copy of the radio software must be submitted and limits on the number of software and hardware combinations under a single approval. AirNet agrees with the Commission that a Class III permissive change should be limited only to software change for the reasons that the Commission

has suggested, i.e. eliminating the ambiguity as to the combination of hardware and software changes that has been approved. Moreover, such software change should include software programmable changes to hardware as previously suggested. Any hardware change to a SDR would disqualify the requested change as a Class III permissive change. However, AirNet strongly discourages any requirement for submission of a copy of radio software for approval since the Commission requires that new test data be submitted to demonstrate compliance. The software could reveal trade secrets and implementation details of the manufacturer's intellectual property that would be a burden for the Commission to keep confidential and may cause unnecessary litigations. Additionally, this would likely discourage manufacturers, particularly smaller innovators, to designate their equipment as a SDR to fully benefit from the new streamline process as well as discourage the development of SDR to bring its benefit to the public.

The Commission also seeks comments on the electronic labeling of SDR and its approved Class III permissive changes. AirNet agrees with the Commission on the need for the alternative labeling method over existing re-labeling of new identification numbers but encourages the Commission to provide the flexibility to support methods other than fixed LCD or LED display. An example of such method is supporting removable display such as laptop or PDA via standard interface to the radio equipment that traditionally does not need a local display (e.g., radio base station). The proposed LCD and LED method is only applicable to SDR based subscriber terminals which have already integrated such displays but may not be applicable for other possible SDR devices. Therefore, AirNet suggests that any new requirement from the Commission on

labeling should be sufficiently flexible to accommodate a variety of the SDR based devices that will be available in the marketplace.

In the matter of security and authentication of the software modifications to SDR devices, AirNet encourages the flexibility of the methods used to verify software has been approved before the software can be downloaded to the SDR. As the Commission suggested, it may be the intention that software for a given hardware platform, such as SDR based subscriber terminals, may be generated by one or more parties other than the original manufacturer of the SDR. In these applications, a secure mechanism to ensure compliance would be required. However, this would not be the case for many SDR products such as base stations where the software download procedure is securely controlled by the manufacturer to protect its own IPR and its authorization. Thus, requiring complex security mechanism could add undue expense where the risk for unauthorized software activation is low. Therefore, AirNet suggests that the Commission allow sufficient degree of flexibility to take into consideration the needs of different SDR devices in terms of distribution of software to them.

Lastly, the Commission also seeks comments on whether it should to enhance its enforcement capability to detect compliance. AirNet does not believe that SDR poses any more threat than any other radio devices and existing enforcement capability is more than adequate to prevent unauthorized modifications to SDR. The history of the wireless industry has demonstrated considerable credibility of self-governing to ensure compliancy to applicable Commission's rules. Thus, the Commission's additional enforcement capability is not warranted.

III. The Conclusion

In closing, AirNet is pleased with the Commission's effort to improve and streamline the approval process to encourage the development and deployment of SDR to serve the public interests. In its comments, AirNet has provided additional insight to the Commission on its proposed rules to help avoid the pitfalls of over-regulation that may stifle the promising SDR technology. AirNet would be glad to support the Commission in its well informed path to successfully introducing SDR to benefit the American public. AirNet's comments are summarized below:

- AirNet congratulates the Commission on its understanding of the promise of SDR and its action to help encourage development and deployment of SDR
- The definition of SDR should be more concise and specific to avoid open interpretation
- AirNet seeks clarification on the proposed streamlined process for Class III permissive changes and requests that the filing fee be reflective of the new process
- AirNet supports the Commission granting only Class III changes to previous SDR grantee but would not support the requirements for a copy of the software radio for approval due to the proprietary nature of such software
- AirNet supports the Commission on the alternative methods for re-labeling the SDR for Class III changes but requests that the labeling method be flexible to accommodate a variety of the SDR devices
- AirNet supports the security of downloading the authorized software to the SDR device but note that the downloading methods should not be

standardized as the requirements are vastly different for different classes of SDR devices

- Finally, AirNet believes that the Commission does not need the additional enforcement capability for SDR because the approval process should be sufficient to monitor compliance.